

Metallide keevitusprotseduuride spetsifitseerimine ja atesteerimine. Osa 4: Keevitusprotseduuri katsed alumiiniumi ja selle sulamite kaarkeevitusel

Specification and approval of welding procedures for metallic materials - Part 4: Welding procedure tests for the arc welding of aluminium and its alloys

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 288-4:1998 sisaldab Euroopa standardi EN 288-4:1992 + A1:1997 ingliskeelset teksti.

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English version

**Specification and approval of welding procedures
for metallic materials - Part 4: Welding procedure
tests for the arc welding of aluminium and its alloys**

Descriptif et qualification d'un mode opératoire de soudage sur les matériaux métalliques - Partie 4: Epreuve de qualification d'un mode opératoire de soudage à l'arc sur l'aluminium et ses alliages

Anforderung und Anerkennung von Schweißverfahren für metallische Werkstoffe - Teil 4: Schweißverfahrensprüfungen für das Lichtbogenschweißen von Aluminium und seinen Legierungen

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Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by Working Group 1 "Specification and approval of welding procedures for metallic materials of CEN/TC 121 "Welding".

For this standard, ISO/TC44/SC10N177 was considered and used as a basis. However, alterations were necessary due to the consideration of experience and updated knowledge.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by 1993-02, and conflicting national standards shall be withdrawn at the latest by 1993-02.

In accordance with the Common CEN/CENELEC Rules the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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0 Introduction

All new welding procedure approvals are to be in accordance with this standard from the date of this issue.

However, this standard does not invalidate previous welding procedure approvals made to former national standards or specifications providing, the intent of the technical requirements is satisfied and the previous procedure approvals are relevant to the application and production work on which they are to be employed.

Also, where additional tests have to be carried out to make the approval technically equivalent, it is only necessary to do the additional tests on a test piece which should be made in accordance with this standard.

Consideration of previous procedure approvals to former national standards or specifications should be at the time of the enquiry or contract stage and agreed between the contracting parties.

1 Scope

This standard specifies how a welding procedure specification is approved by welding procedure tests.

It defines the conditions for the execution of welding procedure approval tests and the limits of validity of an approved welding procedure for all practical welding operations within the range of variables listed in clause 8.

Tests shall be carried out in accordance with this standard unless more severe tests are specified by the relevant application standard or contract, when they shall be applied.

This standard applies to the arc welding of wrought aluminium and its weldable alloys according to ISO 2092 and ISO 2107. In this standard the term aluminium stands for aluminium and its alloys. The principles of this standard may be applied to other fusion welding processes subject to agreement between the contracting parties.

NOTE: Specific service, material or manufacturing conditions may require more comprehensive testing than is specified by this standard in order to gain more information and to avoid repeating the welding procedure tests at a later date just to obtain additional test data.

Such tests may include:

- longitudinal weld tensile test;
- weld bend test or special bend test to measure elongation;
- Charpy V-notch impact test;
- 0,2 % proof stress;
- elongation;
- chemical analysis.

Arc welding is covered by the following processes in accordance with ISO 4063:

- 131 - metal-arc inert gas welding (MIG welding);
 - 141 - tungsten inert gas arc welding (TIG welding);
 - 15 - plasma arc welding;
- other fusion welding processes by agreement.

2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- | | |
|----------------|--|
| EN 287-2, | Approval testing of welders – Fusion welding – Part 2: Aluminium and aluminium alloys. |
| EN 288-1, | Specification and approval of welding procedures for metallic materials – Part 1: General rules for fusion welding. |
| EN 288-2, | Specification and approval of welding procedures for metallic materials – Part 2: Welding procedure specification for arc welding. |
| EN 26520, | Classification of imperfections in metallic fusion welds, with explanation |
| EN..., | Welded butt joints in metallic materials – Transverse tensile tests (Document CEN/TC 121/N139) ¹⁾ |
| EN..., | Welded butt joints in metallic materials – Bend test (Document CEN/TC 121/N138) ¹⁾ |
| ISO 2092:1981, | Light metals and their alloys – Code of designation based on chemical symbols |
| ISO 2107:1983, | Aluminium, magnesium and their alloys – Temper designations |

¹⁾ Under preparation

- ISO 2437:1972, Recommended practice for the X-ray inspection of fusion welded butt joints for aluminium and its alloys and magnesium and its alloys 5 to 50 mm thick
- ISO 3452:1984, Non-destructive testing – Penetrant inspection – General principles
- ISO 4063:1990, Welding brazing, soldering and braze welding of metals – Nomenclature of processes and reference numbers for symbolic representation on drawings
- ISO 6947:1990, Welds – Working positions – Definitions of angles of slope and rotation
- ISO/DIS 10042.2, Arc-welded joints in aluminium and its weldable alloys – Acceptance levels in fusion welding.¹⁾

3 Definitions

For the purpose of this standard, the definitions listed in part 1 of this standard apply.

4 Preliminary welding procedure specification (pWPS)

The preliminary welding procedure specification shall be prepared in accordance with part 2 of this standard. It shall specify the range for all the relevant parameters.

5 Welding procedure test

The making and testing of test pieces representing the type of welding used in production shall be in accordance with clauses 6 and 7 of this standard.

The welder who undertakes the welding procedure test satisfactorily in accordance with this standard is approved for the appropriate range of approval given in the relevant part of EN 287.

6 Test piece

6.1 General

The welded assembly to which the welding procedure will relate in production shall be represented by making a standardized test piece or pieces, as specified in 6.2.

6.2 Shape and dimensions of test pieces

The test pieces shall be of a sufficient size to ensure a reasonable heat distribution.

In figures 1 to 4, "t" is the thickness of the thicker component part.

Additional test pieces, or longer test pieces than the minimum size, may be prepared in order to allow for extra and/or for re-testing specimens (see 7.5).

If required by the application standard, the direction of working, e.g. extrusion, should be marked on the test piece.

The thickness and/or pipe outside diameter of the test pieces shall be selected in accordance with 8.3.2.1 to 8.3.2.4.

Unless otherwise specified, the shape and minimum dimensions of the test piece shall be as follows.

6.2.1 Butt weld in plate

The test piece shall be in accordance with figure 1. The length of the test piece shall be such as to provide for the appropriate test specimens as given in table 1.

6.2.2 Butt weld in pipe

The test piece shall be in accordance with figure 2. When small pipe diameters are used, several test pieces may be necessary.

NOTE: The word "pipe", alone or in combination is used to mean "pipe", "tube" or "hollow section".

¹⁾ Under preparation.